

Tarea N° 1

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Curso: 2do "A"

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1) $e^y = x + y$

$$E = e^y - x - y$$

$$E_x = -1$$

$$\left(\frac{E_x}{E_y} \right)^2 = \frac{-1}{e^y - 1} = \frac{1}{1 - e^x}$$

$$E_y = e^x - 1$$

3) $\text{Arctg} \left(\frac{x}{y} \right) = \frac{1}{2} \ln (x^2 + y^2)$

$$E = \text{Arctg} (x/y) = 1/2 \ln (x^2 + y^2)$$

$$E_x = \frac{(x/y)^2}{1 + (x/y)^2} = \frac{x^2}{x^2 + y^2} = \frac{1}{1 + y^2/x^2} = \frac{x}{y^2 + x^2}$$

$$E_x = \frac{y - x}{y^2 + x^2} = \frac{dy}{dx} \frac{y - x}{y^2 + x^2} = \frac{y - x}{y^2 + x^2}$$

5) $\text{Arctg} (x/y)$

$$E_x = y - \frac{x/y}{1 + (x/y)^2} = \frac{y^2}{y^2 + x^2} = y - \frac{y}{y^2 + x^2} = \frac{y^3 - x^2 y - y}{y^2 + x^2}$$

$$E_y = \frac{(x/y)}{1 + (x/y)^2} = \frac{(-x/y^2)}{y^2 + x^2} = x + \frac{x}{y^2 + x^2} = \frac{x^3 + x y^2 + x}{y^2 + x^2}$$

$$\frac{dy}{dx} = \frac{y(1 - y^2 - x^2)}{x(1 + y^2 + x^2)}$$

Guía la naturaleza, aún relance a tiempo.

7) $\sin(x) - \cos(x-y) = 0$

$E = \sin(x) - \cos(x-y)$

$E_x = \cos(x) + \sin(x-y)$

$E_y = \sin(x) - \sin(x-y)$

$\frac{dy}{dx} = \frac{y \cos x + \sin(x-y)}{\sin x - \sin(x-y)}$

$\frac{dy}{dx} = \frac{y \cos x + \sin(x-y)}{\sin(x-y) - \sin x}$

$\frac{dy}{dx} = - \frac{3x^2 + 2axy + by^2}{ax^2 + 2bxy + 3y^2}$

8) $x^3 + ax^2y + bxy^2 + y^3 = 0$

$E = x^3 + ax^2y + bxy^2 + y^3 = 0$

$E_x = 3x^2 + 2axy + by^2$

$E_y = ax^2 + 2bxy + 3y^2 = 0$

$\frac{dy}{dx} = - \frac{3x^2 + 2axy + by^2}{ax^2 + 2bxy + 3y^2}$

11) $x - y = \arcsin x - \arcsin y$

$E = x - y - \arcsin x + \arcsin y$

$E_x = 1 - \frac{1}{\sqrt{1-x^2}}$

$E_y = -1 + \frac{1}{\sqrt{1-y^2}}$

$\frac{dy}{dx} = \frac{1 - \frac{1}{\sqrt{1-x^2}}}{\frac{1}{\sqrt{1-y^2}} - 1} = \frac{1 - \frac{1}{\sqrt{1-x^2}}}{\frac{1}{\sqrt{1-y^2}} - 1} = \frac{\sqrt{1-x^2} (\sqrt{1-x^2} - 1)}{\sqrt{1-x^2} (\sqrt{1-y^2} - 1)}$

13) $2x^4y^2 - 4x^2y^4 + x^2y^2 = 6$

$E = 2x^4y^2 - 4x^2y^4 + x^2y^2 - 6$

$E_x = 8x^3y^2 - 8y^4 + 2xy^2$

$E_y = 4x^4y - 16x^2y^3 + 2x^2y$

$\frac{dy}{dx} = \frac{2x^3y^2 (4y^2 - 1 - 4x^2)}{2x^2y (2x^2 - 8y^2 + 1)}$

$\frac{dy}{dx} = \frac{y (4y^2 - 1 - 4x^2)}{x (2x^2 - 8y^2 + 1)}$

15) $\sqrt{y} + \sqrt[3]{y} + \sqrt[4]{y^3} = x$

$E = \sqrt{y} + \sqrt[3]{y} + \sqrt[4]{y^3} - x$

$\frac{d}{dx} \left(\frac{y}{2\sqrt{y}} \right)' + \left(\frac{y}{3\sqrt[3]{y^2}} \right)' + \left(\frac{3y}{4\sqrt[4]{y}} \right)' = 1$

$\frac{d}{dx} = \frac{1}{2\sqrt{y}} + \frac{1}{3\sqrt[3]{y^2}} + \frac{3}{4\sqrt[4]{y}}$

Elige la regla que puedes brindar: una variable y una fcn.

17) $x - y = \arcsen x - \arcsen y$

$$x - y = \arcsen x - \arcsen y$$

$$1 - y' = \frac{1}{\sqrt{1-x^2}} - \frac{y'}{\sqrt{1-y^2}} = \frac{y'}{\sqrt{1-y^2}} - y' = \frac{1}{\sqrt{1-x^2}} - 1$$

$$y' \left[\frac{1 - \sqrt{1-y^2}}{\sqrt{1-y^2}} \right] = \left[\frac{1 - \sqrt{1-x^2}}{\sqrt{1-x^2}} \right]$$

$$y' = \frac{(1 - \sqrt{1-x^2}) \sqrt{1-y^2}}{(1 - \sqrt{1-y^2}) \sqrt{1-x^2}}$$

18) $x^3 + 2x^2y - xy^2 + 2y^3 = 2$

$$x^3 + 2x^2y - xy^2 + 2y^3 = 2$$

$$x^3 + 2x^2y - xy^2 + 2y^3 = 2$$

$$y' = \frac{3x^2 + 4xy - y^2}{2xy - 2x^2 - 6y^2}$$

$$3x^2 + 4xy - y^2 - 2x^2y' - y^2 - 2xyy' + 6y^2 = 0$$

$$y'(2x^2 - 2xy + 6y^2) = -3x^2 - 4xy + y^2$$

21) $\frac{x^3}{y^2} + \frac{y^2}{x^3} = \frac{7}{3}$

$$F = \frac{x^3}{y^2} + \frac{y^2}{x^3} - \frac{7}{3}$$

$$F_x = \frac{3x^2}{y^2} - \frac{3y^2}{x^4}$$

$$F_y = \frac{x^3}{y^2} + \frac{y^2}{x^3} - \frac{7}{3}$$

$$\frac{dy}{dx} = \frac{-5x^2/y^2 - 3y^2/x^4}{2x^2/y^3 + 2y/x^3} = \frac{3y(x^4 - y^4)}{2x(x^4 - y^4)} = \frac{3y(x^2 + y^2)}{2x(x^4 + x^2y^2 + y^6)}$$

$$\frac{dy}{dx} = \frac{3y(x^2 - y^2)(x^2 + y^2)}{2x(x^2 - y^2)(x^4 + x^2y^2 + y^6)}$$